



# Vision of SmartGrids

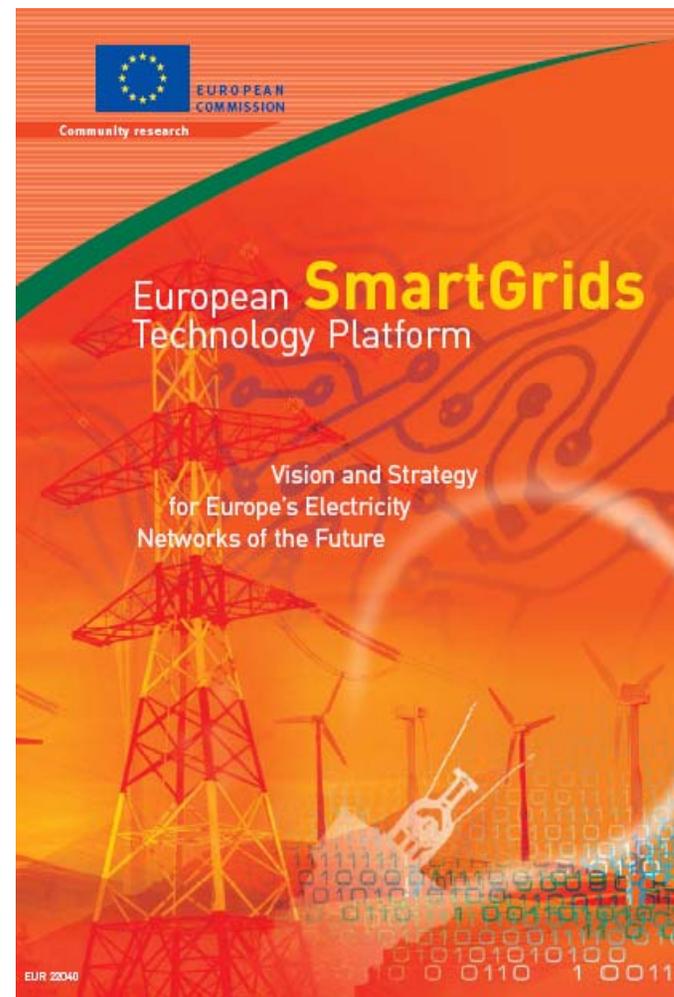
## Technology Platform

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# Overview

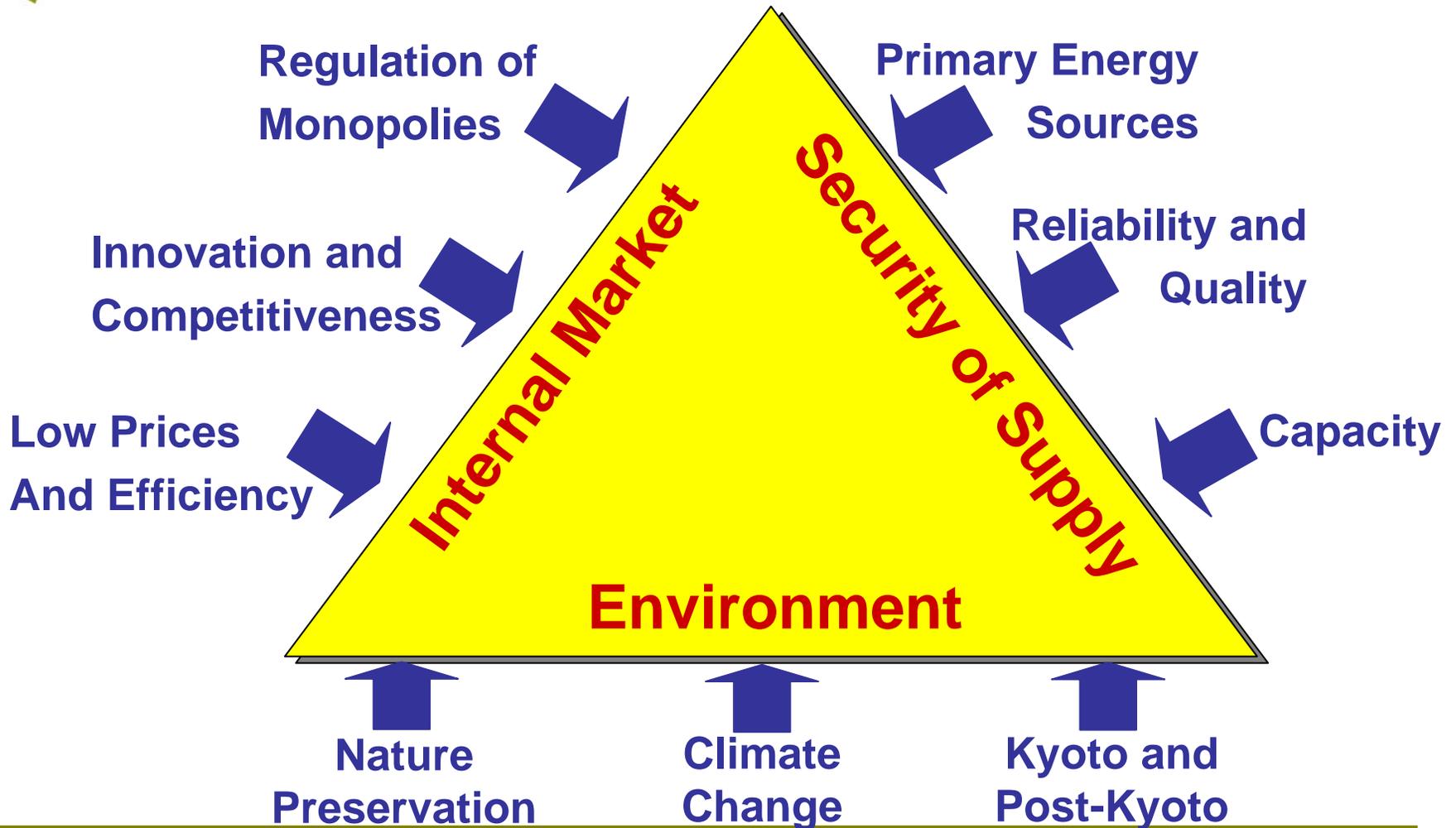
- Why SmartGrids?
- What are the issues?
- Vision, what Vision?
- Concepts for the future
- Related activity
- Flexible framework
- Conclusions





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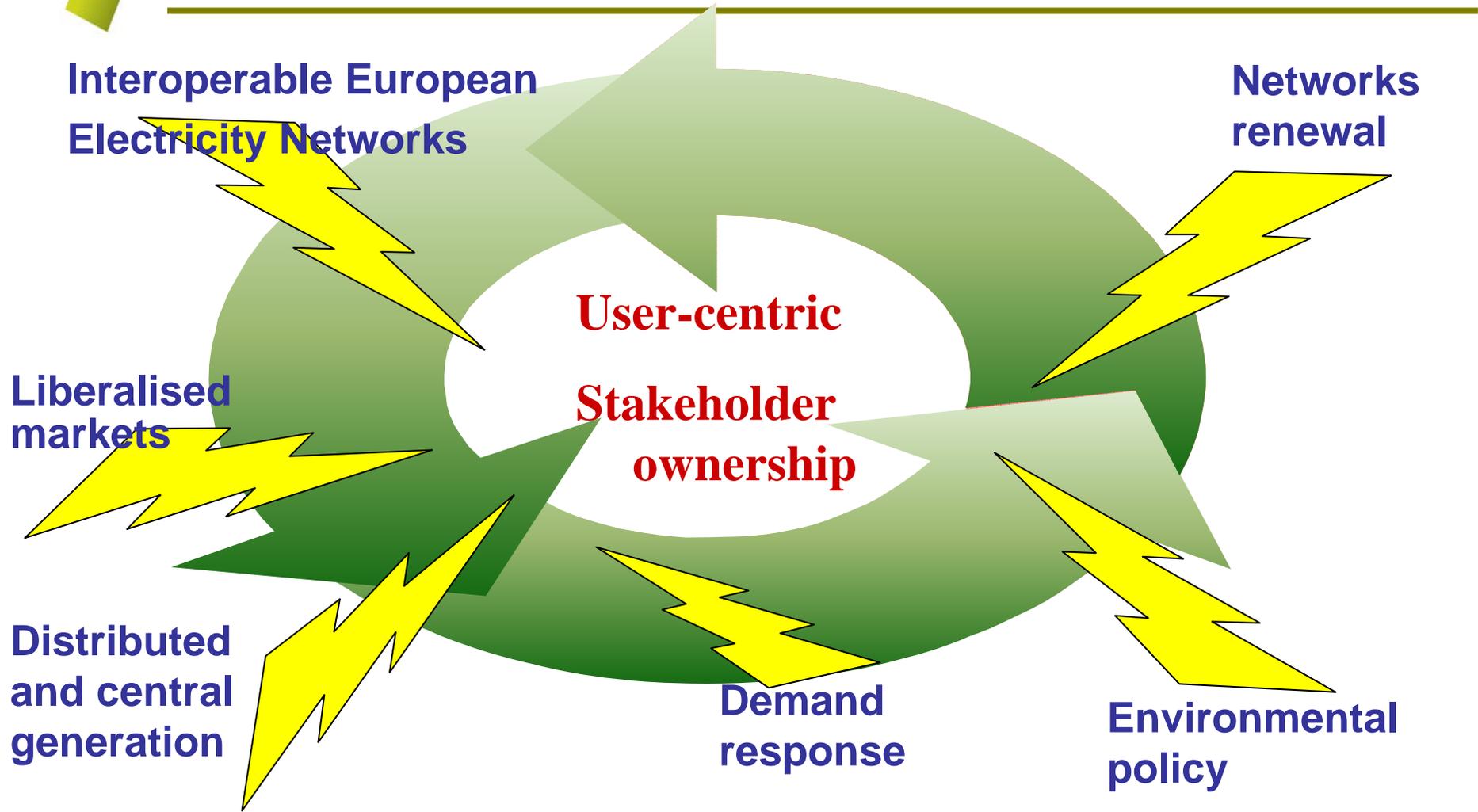
# Drivers towards SmartGrids





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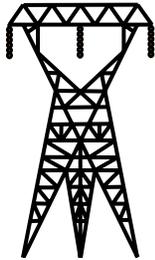
# Why SmartGrids?



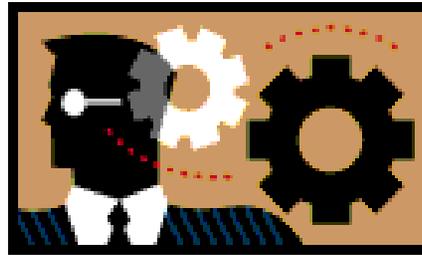


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# The Stakeholders



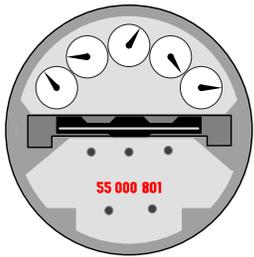
Network companies



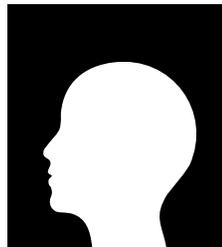
Technology providers



Researchers



Energy service providers



Users



Regulators



Governmental agencies



Traders

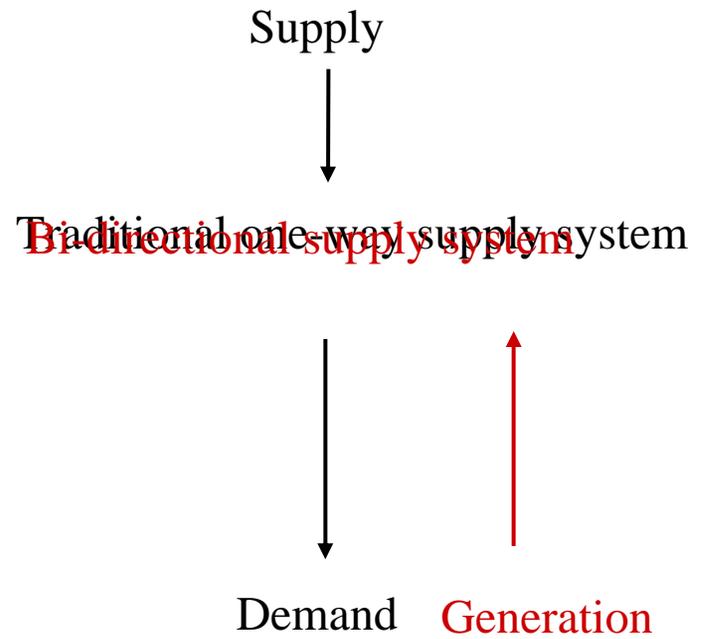
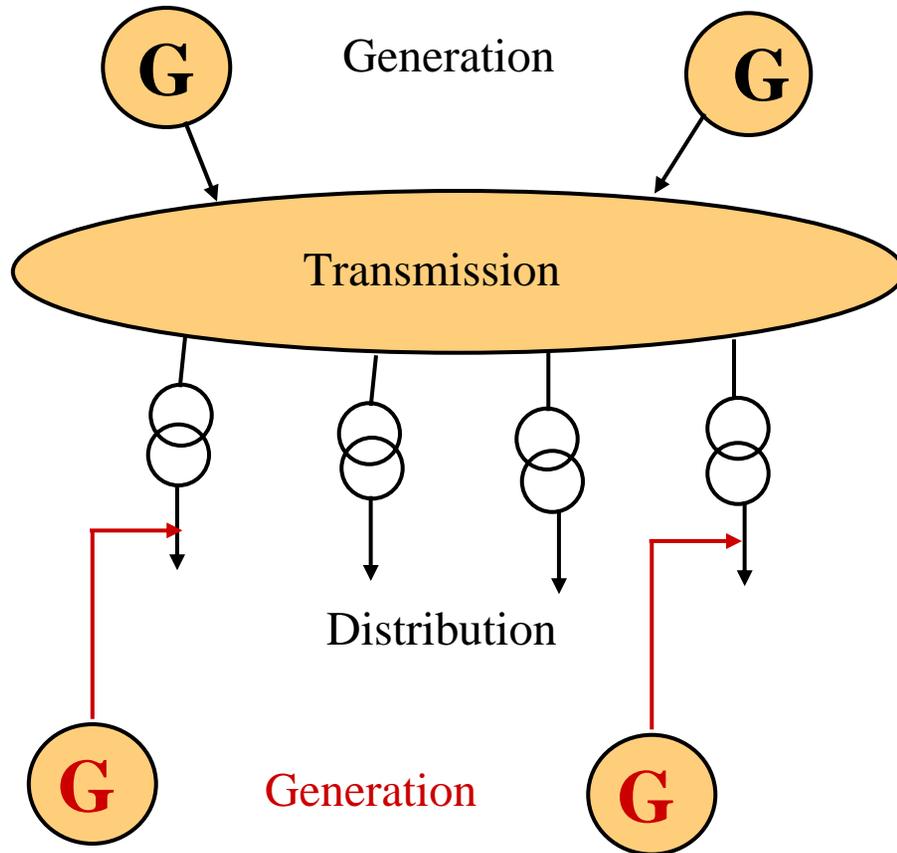


Generators



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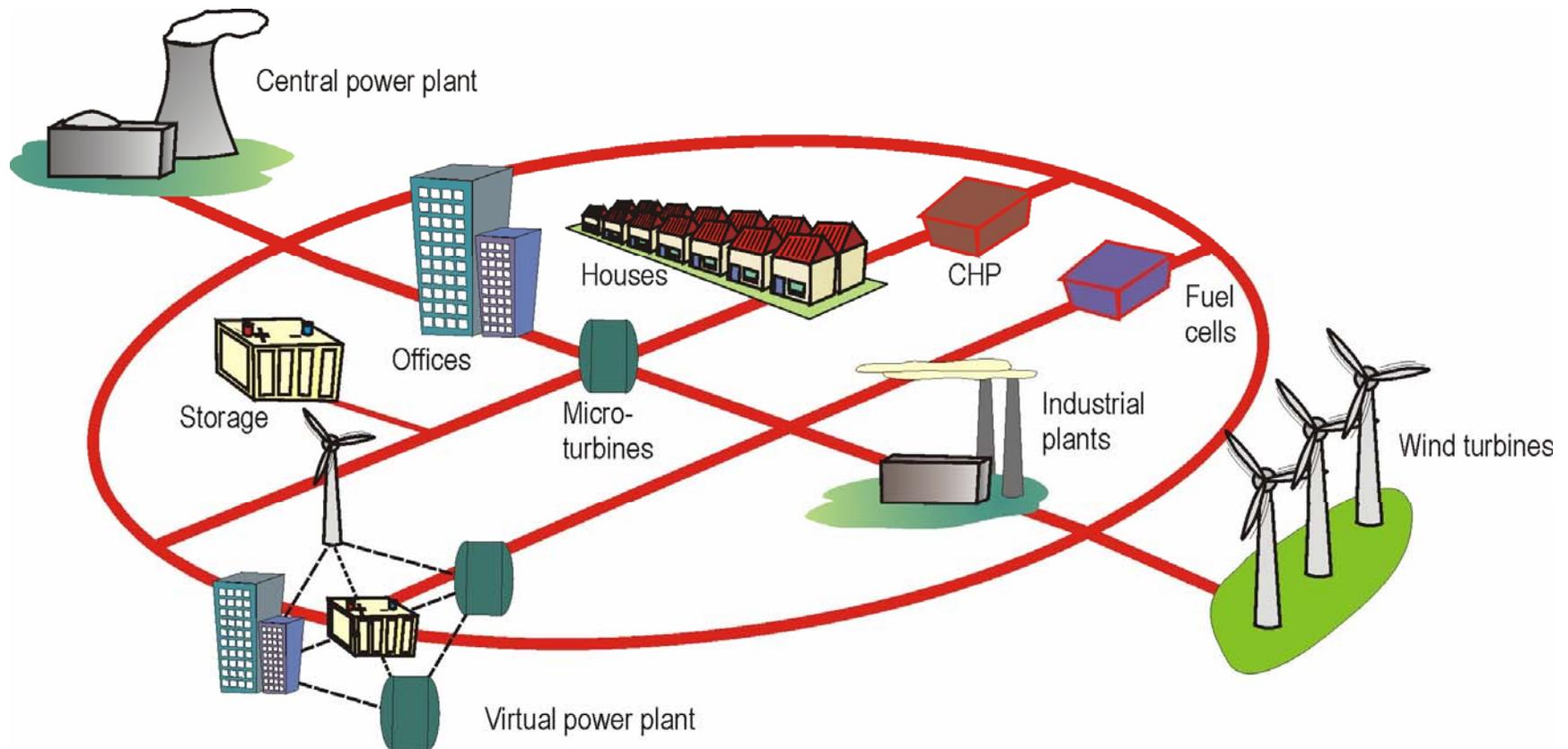
# Networks Today





# Networks Tomorrow

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# Europe's Electricity Networks

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## Future requirements:

- Flexible: user-centric and designed for the future**
- Accessible: connect all users**
- Reliable: security of supply in a digital age**
- Economic: best value -> innovation, efficiency and competition**



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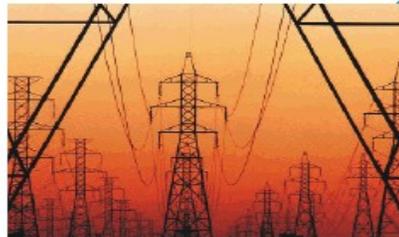
# A Portfolio of Technologies is required



Efficiency in Buildings, Industry and End-Use Products



Vehicles: Efficiency, Hydrogen Fuel Cells



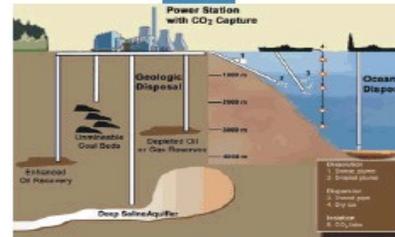
Advanced Power Generation and Grids



Renewable Energy Technologies



Biomass, Synfuels, CHP



CO<sub>2</sub> Capture and Storage



Advanced Nuclear Fission and Fusion

Source: IEA (Vigotti)



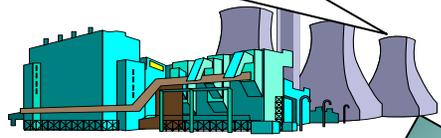
# The interactive Grid

Present and forecast: capacity, availability, price, contract terms



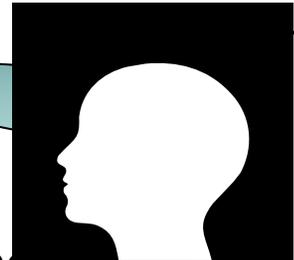
Present and forecast: capacity, availability, price, contract terms. Managing balance, losses, voltage, frequency, reserve.

Grid operator

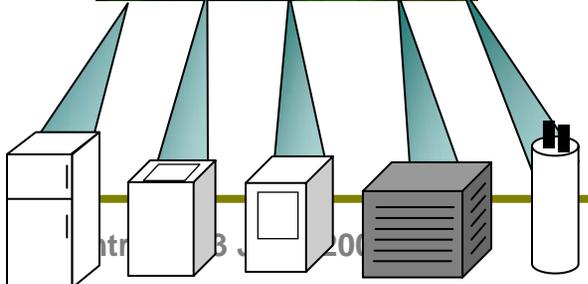


**Intelligent Metering is the gateway**

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User



Appliances, Equipment



# Future Network Vision

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Montreal, 23 June 2006

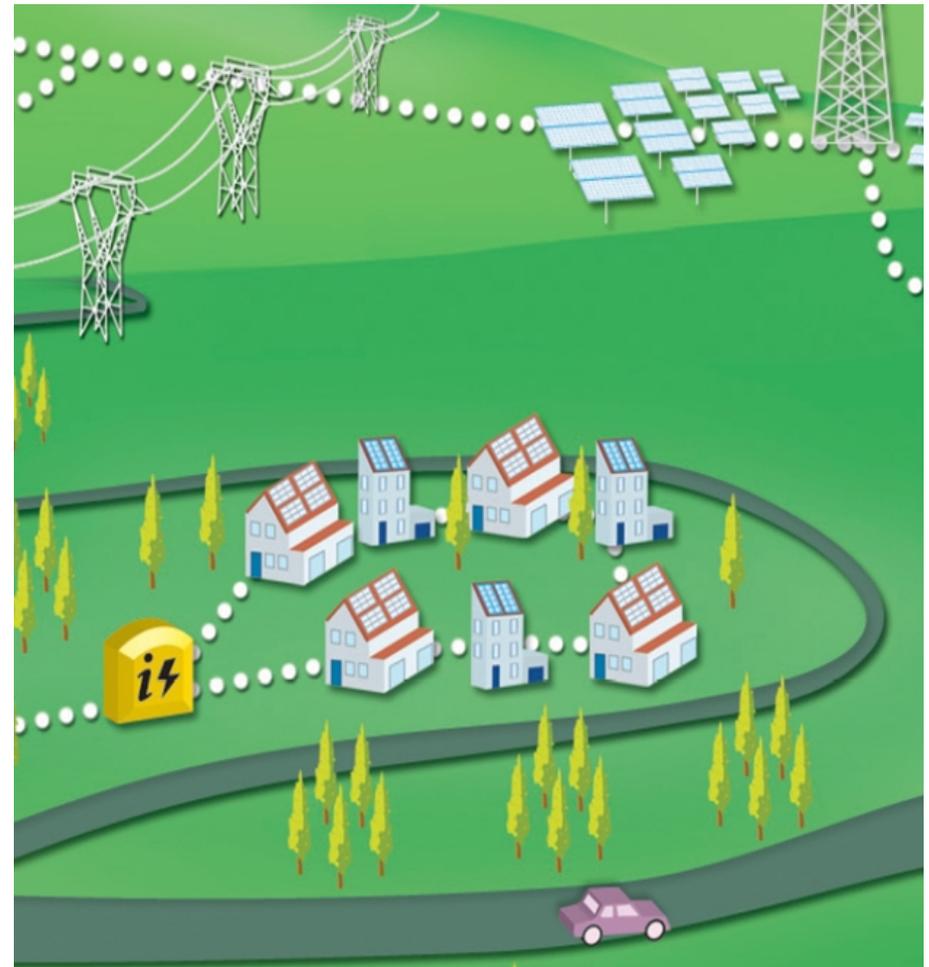
Ronnie Belmans



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# Concepts for the future

- **Microgrids:**
  - Low voltage networks with DG sources, local storage and controllable loads, automatic islanding

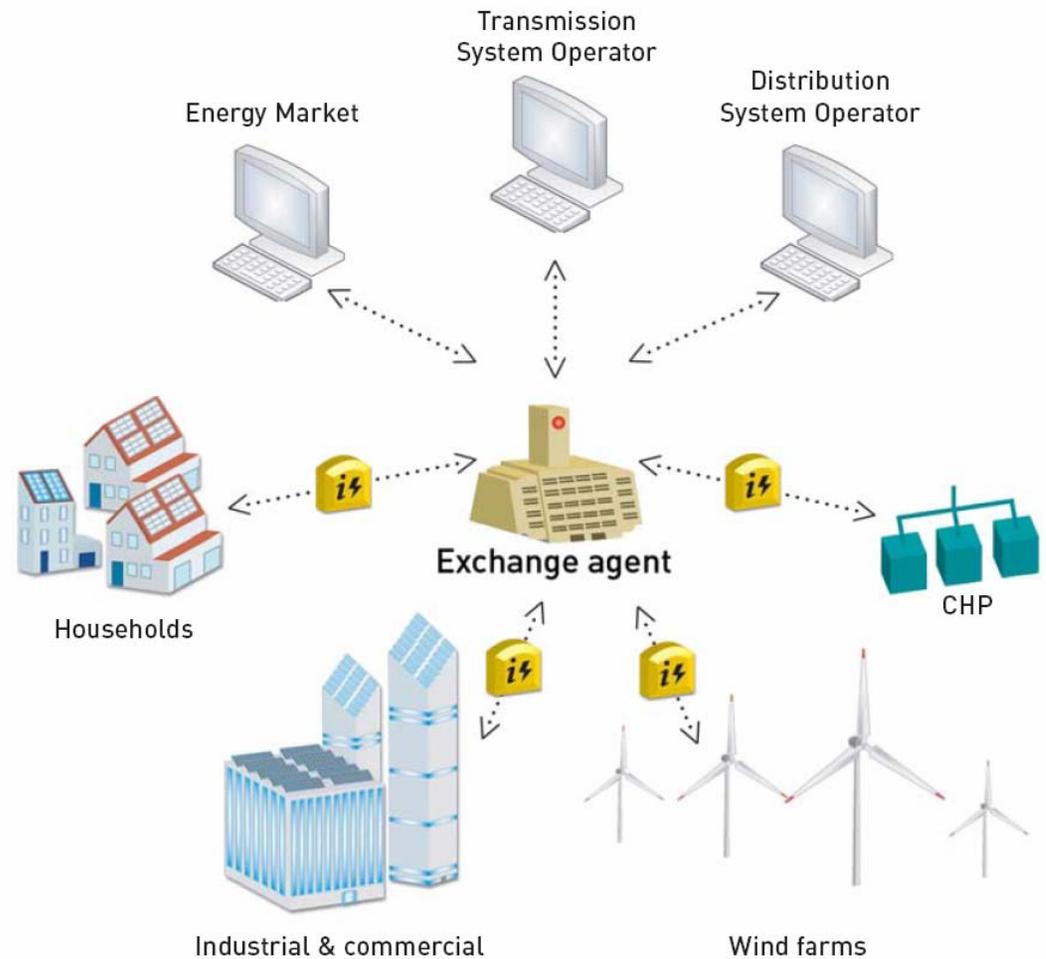




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# Concepts for the future

- **Virtual Utilities:**  
Configure and deliver ->  
“Internet” model





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# Enabling Technologies

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- Active Distribution Networks
- Improved power flow: FACTS, WAMS, WAPS
- Power electronic technologies
- Smart Metering
- Communication for DSM, on-line services, energy management
- Stationary energy storage



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# Points to consider

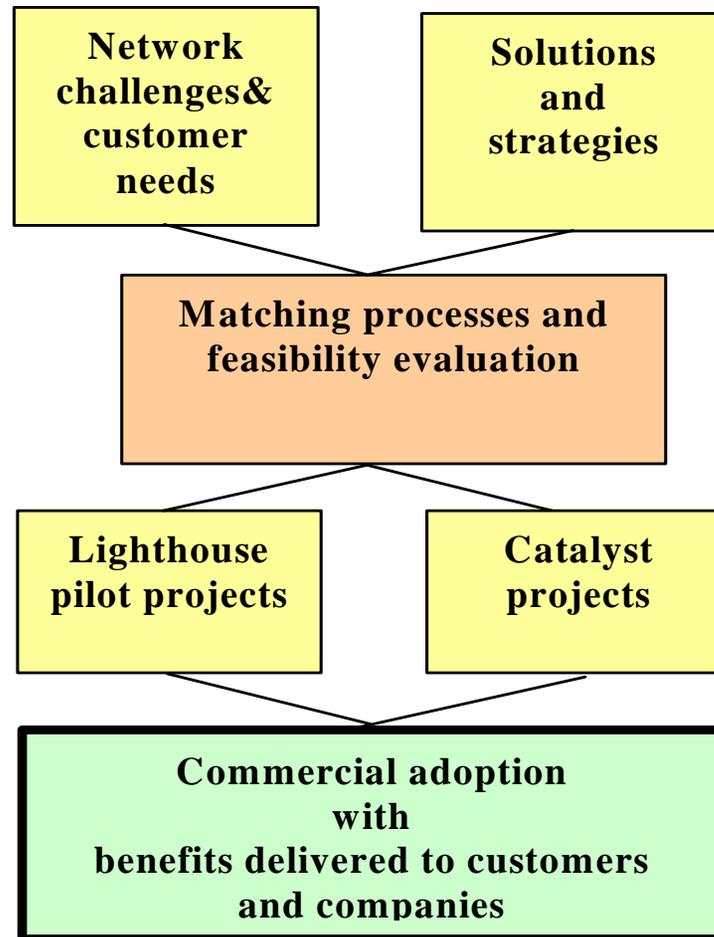
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- Technical, commercial and regulatory solutions**
- Central and distributed generation**
- Integration of innovative technologies**
- Harmonisation of equipment standards**
- Improved cross-border flow**
- Higher education and skills**
- Increased FUNDING to make it happen!**



S M A R T G R I D S

# The flexible Framework



*The R&D process envisaged for delivering the SmartGrids Vision*



# Conclusion

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- We have a VISION
- Strategic Research Agenda launched
- Solutions and strategies – technical, commercial and regulatory – will be identified
- Catalyst and lighthouse projects will be undertaken
- Your input please!



**The best way to predict your  
future is to create it**

**(Peter Drucker)**



**Thank you for your attention!**

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